



STX88831 Series
Intel® Atom™ N270 Processor
STX Form Factor SoM
User's Manual



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If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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CHAPTER 1

INTRODUCTION



The **STX88831** is a STX form factor SoM (System-On-a-Module) to support Intel® Atom™ N270 processor with FSB 533 MHz. It integrates Intel® 945GSE & ICH7M chipsets, designed with the space-limited applications in mind. In addition of onboard features which are integrated on STX88831, the STX standard interface provides 4 PCI Masters and ISA output for expansion design purpose applied on the related Baseboard. With Axiomtek's STX SoM, customers are capable of maintaining the same hardware kernel and adapt various I/O combinations for different application purposes.

1.1 Specifications

- **CPU**
 - Intel® Atom™ N270 processor
- **System Chipset**
 - Intel® 945GSE & ICH7M
- **CPU Frequency**
 - 533 MHz FSB
- **BIOS**
 - AMI BIOS with Axiomtek standard features
 - 8Mbit SPI Flash, DMI, Plug and Play
 - "Load Optimized Default" to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
 - Ethernet Boot ROM (RPL & PXE), customized default saving features, used SPI type Flash memory
- **System Memory**
 - One 200-pin unbuffered DDR2 SO-DIMM socket
 - Maximum to 2GB DDR2 400/533 MHz memory
- **L2 Cache**
 - Integrated in CPU
- **IDE Interface**
 - One PATA-100 to two devices (IDE1 through STX interface connector)
 - One SATA-150 connector
- **Multi I/O Interface**
 - One floppy port (STX interface connector) supporting up two devices
 - One SPP/EPP/ECP parallel port (STX interface connector)
 - Two RS-232
 - One PS2 Keyboard & Mouse support (STX interface connector)

- **USB Interface**
 - Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Graphics**
 - Intel® 945GSE GMCH with GMA 950 integrated graphic engine
 - CRT and TTL or LVDS LCD output
 - Support 24-bit TTL TFT LCD via STX interface connector and 18/24-bit single/dual channel LVDS with Chronitel CH7308B from SDVO as EFP port through AXIOMTEK 30-pin FPC connector (FC1); please be noted that the LCD interface can be used either TTL TFT or LVDS at the same time
- **Watchdog Timer**
 - 1~255 seconds; up to 255 levels
- **Ethernet**
 - One Realtek RTL8103EL 10/100 Fast Ethernet via PCI-Express x1 Bus
- **Audio**
 - AC-link through STX interface for codec on the baseboard
- **Expansion Interface**
 - Four 32-bit/33MHz PCI Bus master
 - Standard ISA Bus
- **Power Management**
 - ACPI (Advanced Configuration and Power Interface)



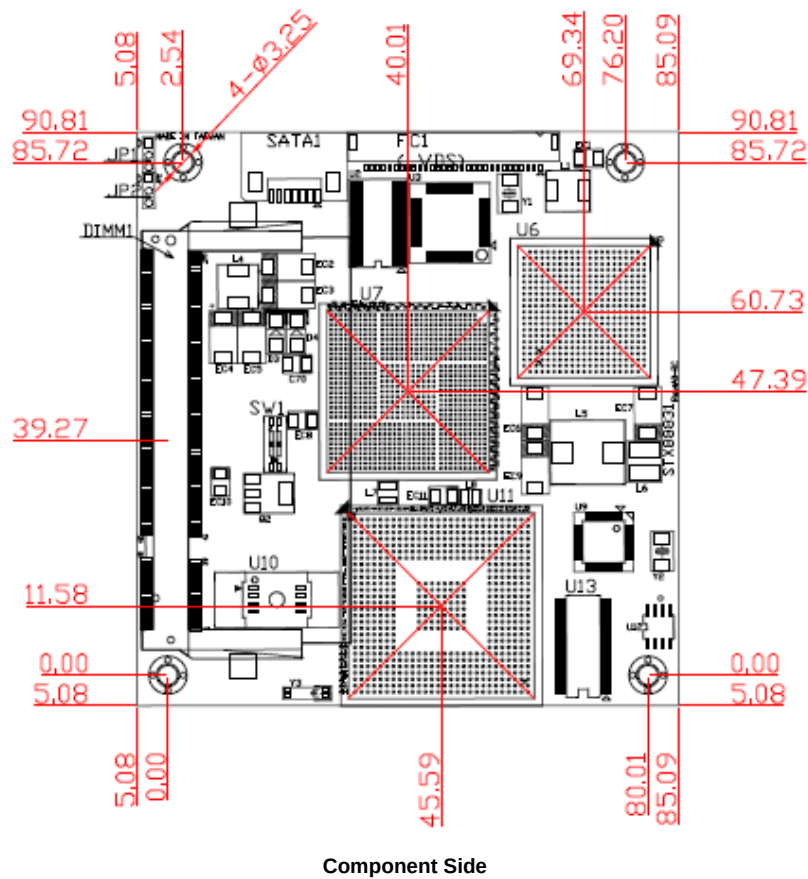
NOTE All specifications and images are subject to change without notice.

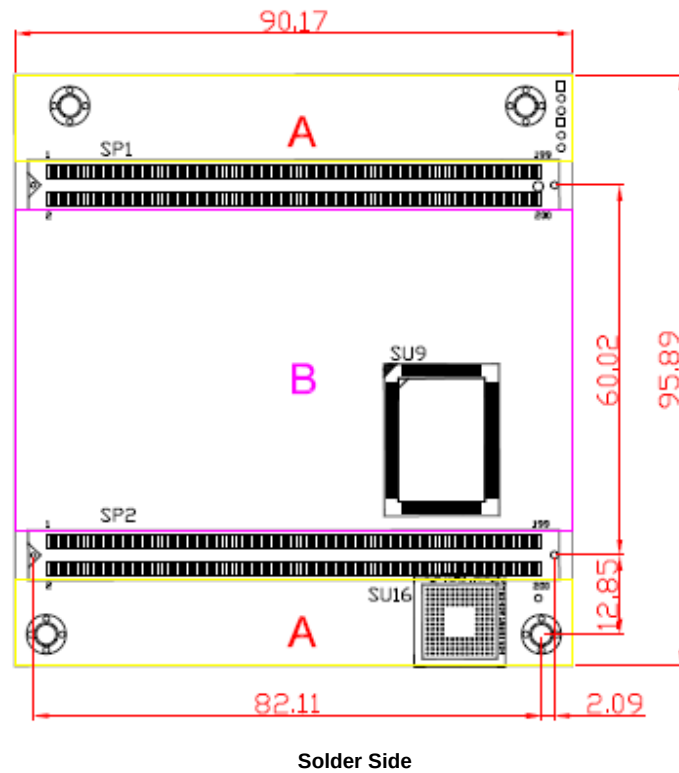
1.2 Utilities Supported

- Chipset Driver
- VGA Driver
- Ethernet Driver
- Audio Driver

CHAPTER 2 JUMPERS AND CONNECTORS

2.1 Board Dimensions and Fixing Holes

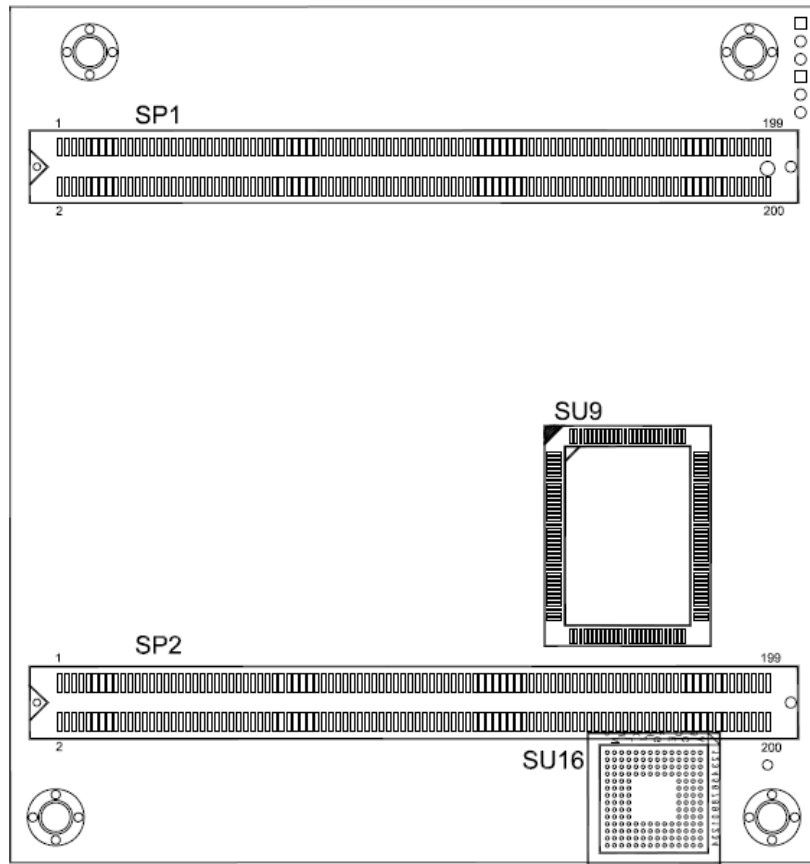




The diagram shows the component side of the STX8831 Rev. A0 PCB. Key components and their locations include:

- Connectors:** JP1, JP2, SATA1, DIMM1, U2, U3, U6, U7, U10, U11, U12, U13, Y1, Y2.
- Chips:** FC1 (LVDS), U6, U7, U10, U11, U12, U13.
- Capacitors:** L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L43, L44, L45, L46, L47, L48, L49, L50, L51, L52, L53, L54, L55, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L70, L71, L72, L73, L74, L75, L76, L77, L78, L79, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, L100.
- Resistors:** R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100.
- Other Components:** SW1, Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q46, Q47, Q48, Q49, Q50, Q51, Q52, Q53, Q54, Q55, Q56, Q57, Q58, Q59, Q60, Q61, Q62, Q63, Q64, Q65, Q66, Q67, Q68, Q69, Q70, Q71, Q72, Q73, Q74, Q75, Q76, Q77, Q78, Q79, Q80, Q81, Q82, Q83, Q84, Q85, Q86, Q87, Q88, Q89, Q90, Q91, Q92, Q93, Q94, Q95, Q96, Q97, Q98, Q99, Q100.

The diagram is labeled "Component Side" at the bottom.



Solder Side

2.3 Jumper Settings

Proper jumper settings configure the **STX88831** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Jumper	Default Setting	Jumper Setting
JP1	LVDS Voltage Selection Default : 3.3V	Short 1-2
JP2	Normal Operation/Clear CMOS setting Default : Normal Operation	Short 1-2
SW1	Auto PowerButton Mode Selection Default : ATX Power Mode	ON

2.3.1 LCD Voltage Selection Jumper (JP1)

The board supports +3.3V or +5V flat panel displays. Configure the jumper **JP1** to the appropriate voltage of the flat panel.

Description	Function	Jumper Setting
LCD Voltage Selection	3.3V (Default)	
	5V	

2.3.2 CMOS Clear Jumper (JP2)

You may need to use this jumper is to clear the CMOS memory if incorrect settings in the Setup Utility.

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	
	Clear CMOS	

2.3.3 Auto Power Button Mode Selection Switch (SW1)

When Jumper **SW1** is set OFF for AC power input, the system will be automatically power ON without pressing soft power button; when **SW1** is ON for AC power input, it is necessary to manually press soft power button to make the system power ON.

Description	Function	Jumper Setting
Auto Power Button Mode Selection	ATX Power Mode (Default)	
	AT Power Mode	



Note This function is similar to the feature of Power On after Power Failed, which is controlled by hardware circuitry instead of BIOS.

2.4 Connectors

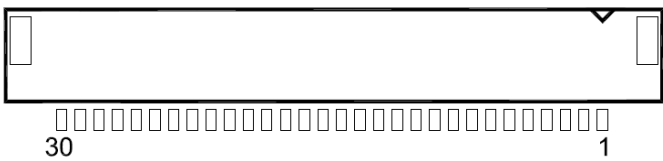
The connectors allow the CPU Board to connect with other parts of the system. Some problems encountered by your system may be a result from loose or improper connections. Ensure that all connectors are in place and firmly attached. The following table lists the function of each connector on the **STX88831**.

Connectors	Label
DDRII SODIMM Connector	DIMM1
LVDS Connector	FC1
SATA Connector	SATA1
STX Connector – P1	SP1
STX Connector – P2	SP2

2.4.1 LVDS Flat Panel Connector (FC1)

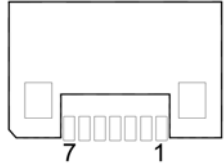
The board has a 30-pin connector **FC1** for LVDS Interface LCD. It is strongly recommended to use the matching Hirose DF19G-30P-1H 30-pin connector for LVDS on the board.

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	L_VDDEN
5	GFPDE	6	LA_BLKEN
7	GND	8	Channel B D3+ (24-Bit support)
9	Channel B D3- (24-Bit support)	10	Channel B CLK+
11	Channel B CLK-	12	Channel B D2+
13	Channel B D2-	14	GND
15	Channel B D1+	16	Channel B D1-
17	GND	18	Channel B D0+
19	Channel B D0-	20	Channel A D3+ (24-Bit support)
21	Channel A D3- (24-Bit support)	22	Channel A CLK+
23	Channel A CLK-	24	GND
25	Channel A D2+	26	Channel A D2-
27	Channel A D1+	28	Channel A D1-
29	Channel A D0+	30	Channel A D0-



2.4.2 Serial ATA Connector (SATA1)

The SATA connector SATA1 is for high-speed SATA interface ports, and It can be connected to hard disk devices.

Pin	Signal	
1	GND	
2	SATA_TX+	
3	SATA_TX-	
4	GND	
5	SATA_RX-	
6	SATA_RX+	
7	GND	

2.4.3 STX Connector (SP1, SP2)



SP1				SP2			
Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	GND	2	NET_TXD+	1	IDE_RESET#	2	GND
3	NET_ACT_LE D#	4	NET_TXD-	3	IDE_D7	4	ISA_ IOCHCK#
5	NET_LINK_LE D#	6	NET_CTREF	5	IDE_D8	6	ISA_SD7
7	DISK_LED#	8	LAN_RXD+	7	IDE_D6	8	ISA_ RSETDRV
9	SPEAKR	10	LAN_RXD-	9	IDE_D9	10	ISA_SD6
11	PCI_GNT3#	12	GND	11	IDE_D5	12	VCC_5V
13	RSTBTN#	14	VCC_5V_SBY	13	IDE_D10	14	ISA_SD5
15	PWRBTN#	16	VCC_5V_SBY	15	IDE_D4	16	ISA_IRQ9
17	WAKE_EVENT	18	PS_ON#	17	IDE_D11	18	ISA_SD4
19	GND	20	AC_RST#	19	IDE_D3	20	GND
21	PS2_KB_CLK	22	AC_SDIN	21	IDE_D12	22	ISA_SD3
23	PS2_KB_DAT A	24	AC_BITCLK	23	IDE_D2	24	ISA_DRQ2
25	PS2_MS_CLK	26	AC_SDOUT	25	IDE_D13	26	ISA_SD2
27	PS2_MS_DAT A	28	AC_SYNC	27	IDE_D1	28	VCC_5V
29	VCC_5V	30	GND	29	IDE_D14	30	ISA_SD1
31	N.C	32	I2C_CLK	31	IDE_D0	32	ISA_ZEROWS #
33	PCI_REQ3#	34	I2C_DATA	33	IDE_D15	34	ISA_SD0
35	CPU_THERM D_A	36	GND	35	IDE_IRQ	36	IDE_PATADET
37	CPU_THERM D_C	38	IR_RX (OPTION)	37	IDE_REQ	38	ISA_GPCS#
39	VCC_RTC	40	IR_TX (OPTION)	39	IDE_IOW#	40	N.C

SP1				SP2			
Pin	Description	Pin	Description	Pin	Description	Pin	Description
41	VCC_5V	42	HW_VCORE	41	IDE_IOR#	42	ISA_IOCHRDY
43	PCI_AD0	44	VCC_5V	43	IDE_IORDY	44	GND
45	PCI_AD1	46	VCC_5V	45	IDE_ACK#	46	ISA_MEMCS16#
47	VCC_5V	48	PCI_AD2	47	IDE_A1	48	ISA_SBHE#
49	PCI_AD4	50	PCI_AD5	49	IDE_A0	50	ISA_AEN
51	PCI_AD3	52	GND	51	IDE_A2	52	ISA_SMEMW#
53	GND	54	PCI_C/BE0#	53	IDE_CS0#	54	ISA_IOCS16#
55	PCI_AD6	56	PCI_AD7	55	IDE_CS1#	56	ISA_LA23
57	PCI_AD8	58	GND	57	GND	58	ISA_SA19
59	GND	60	PCI_AD9	59	FDC_DENSEL	60	ISA_SMEMR#
61	PCI_AD10	62	PCI_AD11	61	FDC_INDEX#	62	ISA_IRQ10
63	VCC_3.3V	64	VCC_3.3V	63	FDC_MTR0#	64	ISA_LA22
65	N.C	66	PCI_AD14	65	N.C	66	ISA_SA18
67	PCI_AD12	68	PCI_AD13	67	FDC_DS0#	68	ISA_IOW#
69	PCI_AD15	70	VCC_3.3V	69	N.C	70	ISA_IRQ11
71	VCC_3.3V	72	PCI_C/BE1#	71	FDC_DIR#	72	ISA_LA21
73	VCC_3.3V	74	PCI_SERR#	73	FDC_STEP#	74	ISA_SA17
75	PCI_PAR	76	GND	75	FDC_WDATA#	76	ISA_IOR#
77	GND	78	GND	77	FDC_WGATE#	78	ISA_IRQ12
79	GND	80	PCI_PERR#	79	FDC_TRACK0#	80	ISA_LA20

SP1				SP2			
Pin	Description	Pin	Description	Pin	Description	Pin	Description
81	PCI_LOCK#	82	PCI_STOP#	81	FDC_WP#	82	ISA_SA16
83	VCC_3.3V	84	VCC_3.3V	83	FDC_RDATA#	84	ISA_DACK3#
85	VCC_3.3V	86	VCC_3.3V	85	FDC_HDSEL#	86	ISA_IRQ15
87	PCI_DEVSEL#	88	PCI_TRDY#	87	FDC_DSKCHG#	88	ISA_LA19
89	PCI_IRDY#	90	PCI_FRAME#	89	GND	90	ISA_SA15
91	GND	92	GND	91	LPT_STB#	92	ISA_DRQ3
93	GND	94	GND	93	LPT_AFD#	94	ISA_IRQ14
95	PCI_C/BE2#	96	PCI_AD16	95	LPT_PD0	96	ISA_LA18
97	PCI_AD17	98	PCI_AD18	97	LPT_ERROR#	98	ISA_SA14
99	VCC_3.3V	100	VCC_3.3V	99	LPT_PD1	100	ISA_DACK1#
101	VCC_3.3V	102	PCI_AD21	101	LPT_INIT#	102	ISA_LA17
103	PCI_AD19	104	PCI_AD20	103	LPT_PD2	104	ISA_DACK0#
105	PCI_AD22	106	VCC_3.3V	105	LPT_SLIN#	106	ISA_DRQ1
107	USB2-	108	PCI_AD23	107	LPT_PD3	108	ISA_SA13
109	USB2+	110	PCI_PME#	109	LPT_PD4	110	ISA_MEMR#
111	USB3+	112	GND	111	LPT_PD5	112	ISA_DRQ0
113	USB3-	114	PCI_AD24	113	LPT_PD6	114	ISA_REFRESH#
115	PCI_CLK3	116	PCI_C/BE3#	115	LPT_PD7	116	ISA_SA12
117	PCI_AD25	118	GND	117	LPT_ACK#	118	ISA_MEMW#
119	GND	120	PCI_AD26	119	LPT_BUSY	120	ISA_DACK5#

SP1				SP2			
Pin	Description	Pin	Description	Pin	Description	Pin	Description
121	PCI_AD28	122	PCI_AD29	121	LPT_PE	122	ISA_SYSCLK
123	PCI_AD27	124	VCC_3.3V	123	LPT_SLCT	124	ISA_SA11
125	VCC_3.3V	126	VCC_3.3V	125	GND	126	ISA_SD8
127	PCI_AD31	128	PCI_REQ1#	127	DCD1#	128	ISA_DRQ5
129	PCI_AD30	130	PCI_REQ0#	129	RXD1	130	ISA_IRQ7
131	VCC_5V	132	VCC_5V	131	TXD1#	132	ISA_SA10
133	VCC_5V	134	VCC_5V	133	DTR1#	134	ISA_SD9
135	PCI_GNT0#	136	PCI_GNT2#	135	DSR1#	136	ISA_DACK6#
137	PCI_REQ2#	138	PCI_GNT1#	137	RTS1#	138	ISA_IRQ6
139	GND	140	GND	139	CTS1#	140	ISA_SA9
141	PCI_CLK1	142	GND	141	RI1#	142	ISA_SD10
143	GND	144	PCI_CLK2	143	DCD2#	144	ISA_DRQ6
145	PCI_CLK0	146	VCC_5V	145	RXD2	146	ISA_IRQ5
147	VCC_5V	148	N.C	147	TXD2#	148	ISA_SA8
149	FP_SCLK	150	FP_SDATA	149	DTR2#	150	ISA_SD11
151	PCI_RESET#	152	PCI_INTD#	151	DSR2#	152	ISA_DACK7#
153	PCI_INTC#	154	PCI_INTA#	153	RTS2#	154	ISA_IRQ4
155	PCI_INTB#	156	FP_BKL_EN	155	CTS2#	156	ISA_SA7
157	GND	158	FP_EDGE	157	RI2#	158	ISA_SD12
159	FP_VSYNC	160	FP_HSYNC	159	GND	160	ISA_DRQ7

SP1				SP2			
Pin	Description	Pin	Description	Pin	Description	Pin	Description
161	FP_DSEL	162	GND	161	USB0-	162	ISA_IRQ3
163	FP_VDD_EN	164	FP_CLK_P	163	USB0+	164	ISA_SA6
165	FP_BSEL	166	GND	165	GND	166	ISA_SD13
167	FP_DATA_EN ABLE	168	FP_CLK_S	167	USB1-	168	VCC_5V
169	VCC_5V	170	VCC_5V	169	USB1+	170	ISA_DACK2#
171	FP_D0	172	FP_D12	171	GND	172	ISA_SA5
173	FP_D1	174	FP_D13	173	USB_0_1_OC #	174	ISA_SD14
175	FP_D2	176	GND	175	USB_2_3_OC #	176	ISA_ MASTER#
177	FP_D3	178	FP_D14	177	VGA_DCC_CLK	178	ISA_TC
179	GND	180	FP_D15	179	VGA_DCC_DATA	180	ISA_SA4
181	FP_D4	182	FP_D16	181	GND	182	ISA_SD15
183	FP_D5	184	FP_D17	183	VGA_GREEN	184	WOL
185	FP_D6	186	GND	185	GND	186	ISA_BALE
187	FP_D7	188	FP_D18	187	VGA_RED	188	ISA_SA3
189	GND	190	FP_D19	189	GND	190	VCC_5V
191	FP_D8	192	FP_D20	191	VGA_BLUE	192	ISA_SA2
193	FP_D9	194	FP_D21	193	GND	194	ISA_OSC
195	FP_D10	196	GND	195	VGA_VSYNC	196	ISA_SA1
197	FP_D11	198	FP_D22	197	GND	198	ISA_SA0
199	GND	200	FP_D23	199	VGA_HSYNC	200	GND

-- End of STX Connector Table --

CHAPTER 3

HARDWARE DESCRIPTION

3.1 Microprocessors

The **STX88831** Series supports Intel® Atom™ N270 processor, which make your system operated under Windows XP/Vista and Linux environments. The system performance depends on the microprocessor. Make sure your installed microprocessor with all correct settings that prevent the CPU from damages.

3.2 BIOS

The **STX88831** Series uses American Megatrends BIOS with 8Mbit SPI Flash, DMI, Plug and Play.

3.3 System Memory

The **STX88831** Series industrial CPU card supports one 200-pin unbuffered DDR2 SO-DIMM socket for a maximum memory of 2GB DDR2 SDRAM. The memory module can come in sizes of 128MB, 256MB, 512MB, 1GB and 2GB.

3.4 I/O Port Address Map

There are total 1KB port addresses (under OS WinXP) available for assignment to other devices via I/O expansion cards.

Address	Devices
0000-000F 0081-0083 0087 0089-008B 008F 00C0-00DF	Direct Memory Access controller
0000-0CF7 0D00-FFFF	PCI Bus
0020-0021 00A0-00A1	Interrupt controller
0040-0043	System timer
0060 0064	Standard 101/102 Key or Microsoft Natural PS/2 Keyboard
0061	System speaker
0070-0071	System CMOS/Real time clock
0274-0277 0279 0A79	ISAPNP Read Data Port
02F8-02FF	Communications Port (COM2)
0378-037F	Printer Port (LPT1)
03B0-03BB 03C0-03DF DC80-DC87	Mobile Intel® 945 Express Chipset Family
03F8-03FF	Communications Port (COM1)
0400-041F	Intel® 82801G (ICH7 Family) SMBus Controller
DC00-DC1F	Intel® 82801G (ICH7 Family) USB Universal Host Controller

Address	Devices
CC00-CC0F CC80-CC83 D000-D007 D080-D083 D400-D407	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller
D480-D4BF D800-D8FF	Vinyl AC'97 codec Combo Driver (WDM)
E000-EFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port
EC00-ECFF	Realtek PCIe FE Family Controller
FFA0-FFAF	Intel® 82801G (ICH7 Family) Ultra ATA Storage Controllers

3.5 Interrupt Controller

The **STX88831 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines, and four out of them can be programmable. The mapping list of the 16 interrupt request lines is shown as the following table.

IRQ	Parity check error
IRQ0	System timer output
IRQ1	Standard 101/102 Key or Microsoft Natural PS/2 Keyboard
IRQ3	Communication Port (COM2)
IRQ4	Communication Port (COM1)
IRQ8	System CMOS/Real time clock
IRQ9	Microsoft ACPI Controller
IRQ11	Intel® 82801G (ICH7 Family) SMBus Controller
IRQ12	Microsoft PS/2 Mouse
IRQ13	Numeric data processor
IRQ14	Primary IDE Channel
IRQ16	Intel® 82801G (ICH7 Family) PCI Express Root Port
IRQ16	Mobile Intel® 945 Express Chipset Family
IRQ16	Realtek PCIe FE Family Controller
IRQ17	Vinyl AC'97 codec Combo Driver (WDM)
IRQ19	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller
IRQ23	Intel® 82801G (ICH7 Family) USB Universal Host Controller
IRQ23	Intel® 82801G (ICH7 Family) USB2 Enhanced Host Controller

3.6 Memory Map

Address	Devices
00000000-0009FFFF	System board
000A0000-000BFFFF	Mobile Intel® 945 Express Chipset Family
000A0000-000BFFFF	PCI Bus
000C0000-000CFFFF	System board
000D0000-000DFFFF	PCI Bus
000E0000-000FFFFF	System board
00100000-1F7FFFFF	System board
1F800000 - DFFFFFFF	PCI Bus
D0000000-DFFFFFFF	Mobile Intel® 945 Express Chipset Family
E4000000 – FED8FFFF	PCI Bus
FDF00000-FDFFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port
FDFF0000-FDFFFFFF	Realtek PCIe FE Family Controller
FE980000-FE9FFFFF	Mobile Intel® 945 Express Chipset Family
FEA3B000-FEA3B3FF	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller
FEA3B400-FEA3B4FF	Vinyl AC'97 codec Combo Driver (WDM)
FEA3B800-FEA3B9FF	Vinyl AC'97 codec Combo Driver (WDM)
FEA3BC00-FEA3BFFF	Intel® 82801G (ICH7 Family) USB2 Enhanced Host Controller

Address	Devices
FEA40000- FEA7FFFF	Mobile Intel® 945 Express Chipset Family
FEA80000- FEAFFFFFF	Mobile Intel® 945 Express Chipset Family
FEB00000- FEAFFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port
FEBFF000- FEBFFFFFF	Realtek PCIe FE Family Controller

MEMO

CHAPTER 4

AMI BIOS UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the AMIBIOS8 BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Delete> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.

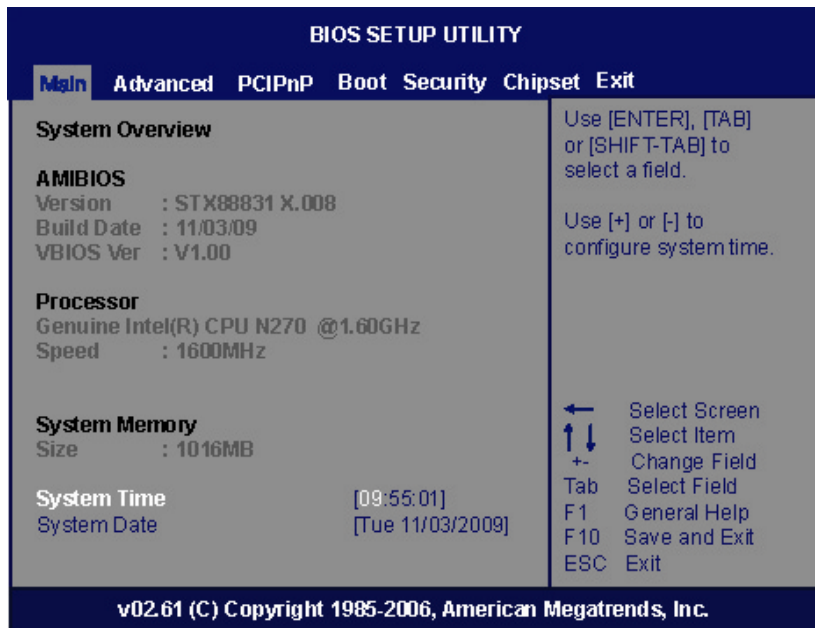


Note Some of navigation keys differ from one screen to another.

← Left/Right	The Left <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



- **System Time/Date**

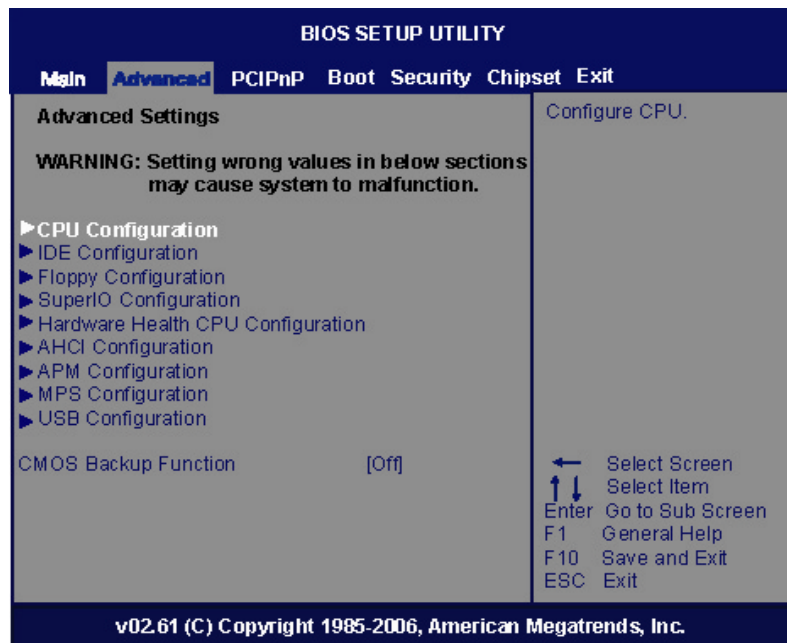
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

The Advanced menu allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

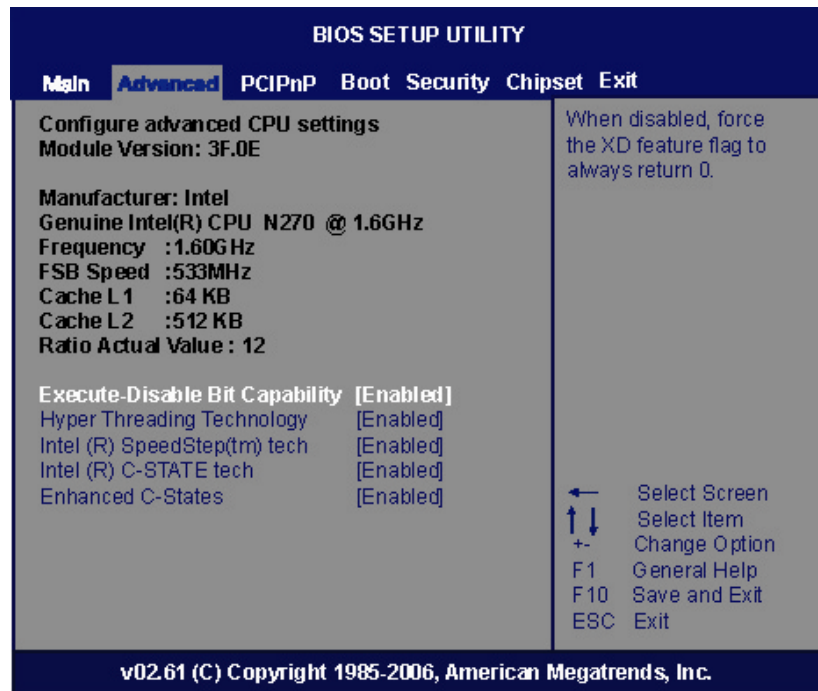
- CPU Configuration
- IDE Configuration
- Floppy Configuration
- SuperIO Configuration
- Hardware Health CPU Configuration
- ACPI Configuration
- APM Configuration
- MPS Configuration
- PCI Express Configuration
- USB Configuration

For items marked with “►”, please press <Enter> for more options.



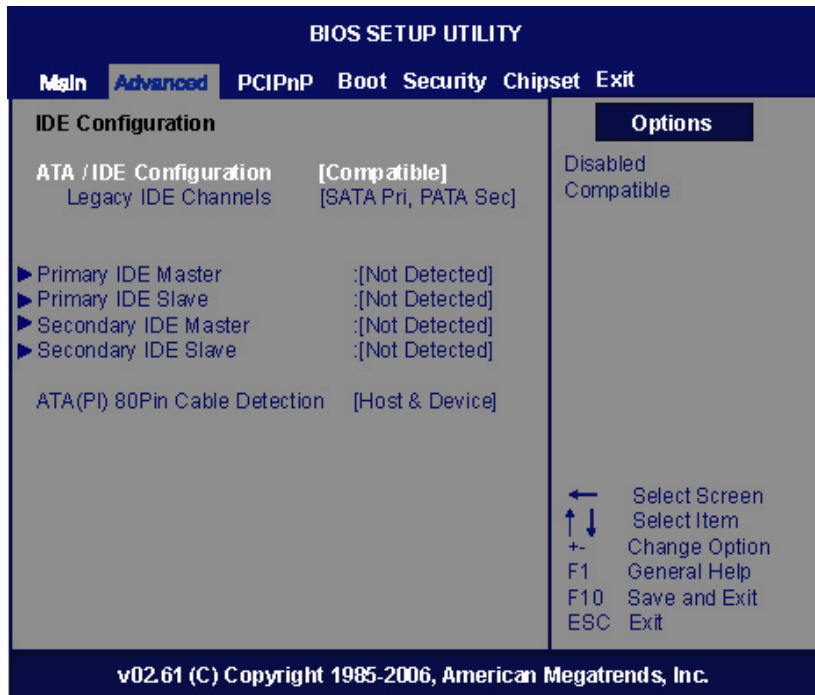
- **CPU Configuration**

This screen shows the CPU Configuration, and you can change the value of the selected option.



- **Execute-Disable Bit Capability**
This item helps you enable or disable the No-Execution Page Protection Technology.
- **Hyper Threading Technology**
Use this item to enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.
- **Intel (R) SpeedStep (tm) tech**
This item helps you enable or disable the Intel SpeedStep Technology.

- **Intel (R) C-STATE tech**
Use this item to enable or disable the C-State technology.
- **Enhanced C-States**
This item allows you to enable or disable any available enhanced C-states (C1E, C2E, C3E, C4E and Hard C4E).
- **IDE Configuration**
You can use this screen to select options for the IDE Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with “▶”, please press <Enter> for more options.

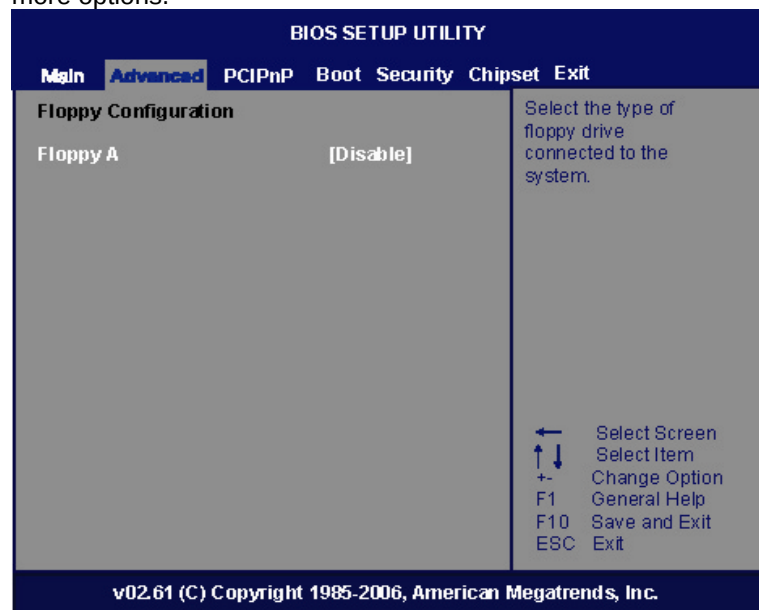


- **ATA/IDE Configuration**
Use this item to specify the integrated IDE controller. There are three options for your selection: *Disabled* and *Compatible*.

- **Legacy IDE Channels**
When the ATA/IDE Configuration is set to *Compatible*, this item will be displayed.
- **Primary/Secondary IDE Master/Slave**
Select one of the hard disk drives to configure IDE devices installed in the system by pressing <Enter> for more options.

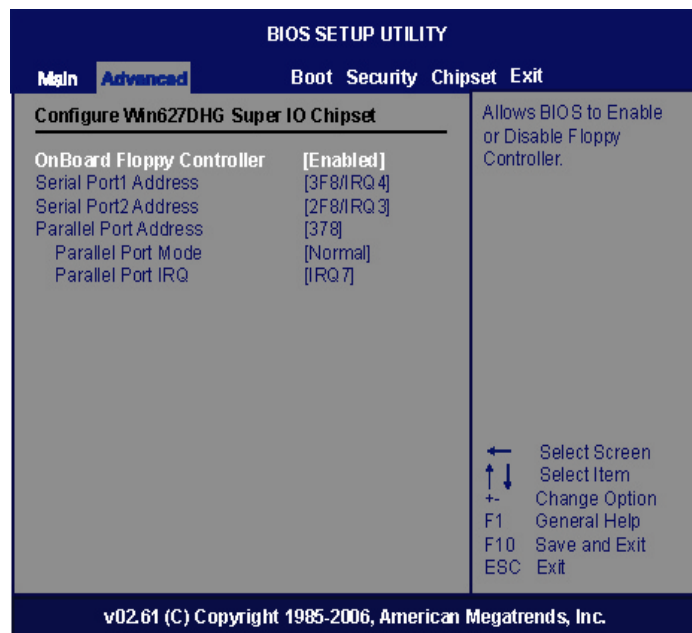
- **Floppy Configuration**

You can use this screen to select options for the Floppy Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with “▶”, please press <Enter> for more options.



● SuperIO Configuration

You can use this screen to select options for the SuperIO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

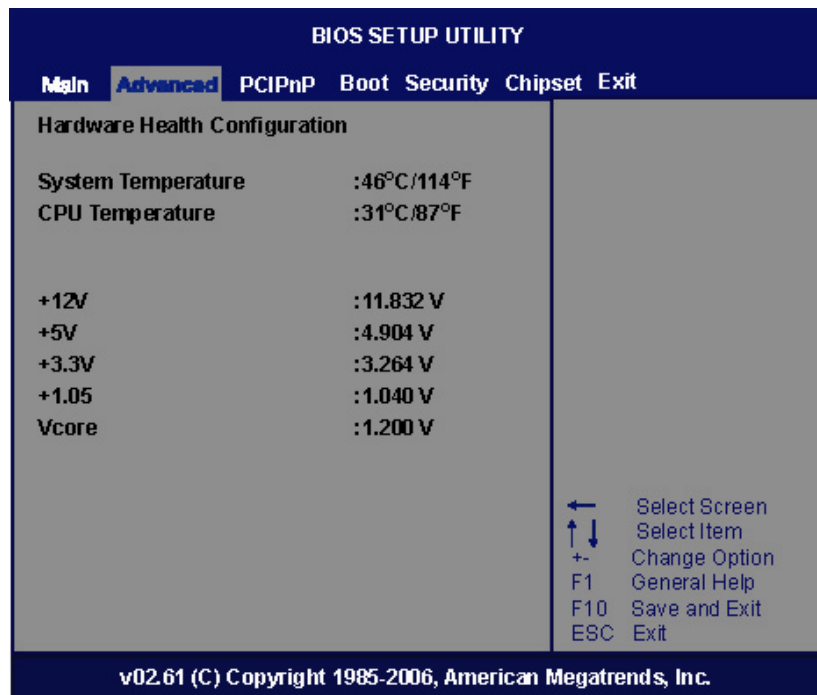


- **OnBoard Floppy Controller**
Use this item to enable or disable the onboard floppy drive controller.
- **Serial Port1 Address**
This item specifies the base I/O port address and Interrupt Request address of serial port 1. The Optimal setting is *3F8/IRQ4*. The Fail-Safe default setting is *Disabled*.
- **Serial Port1 IRQ**
This item specifies the IRQ used by the serial port 1.

- **Serial Port2 Address**
This item specifies the base I/O port address and Interrupt Request address of serial port 2. The Optimal setting is *2F8/IRQ3*. The Fail-Safe setting is *Disabled*.
- **Serial Port2 IRQ**
This item specifies the IRQ used by the serial port 2.
- **Parallel Port Address**
This item allows you to determine the I/O address for onboard parallel port. There are several options for your selection.
 - **Parallel Port Mode**
Select an operating mode for the onboard parallel (printer) port.
 - **Parallel Port IRQ**
Use this item to set up the IRQ for onboard parallel port.

- **Hardware Health Configuration**

This screen shows the Hardware Health CPU Configuration, and a description of the selected item appears on the right side of the screen.

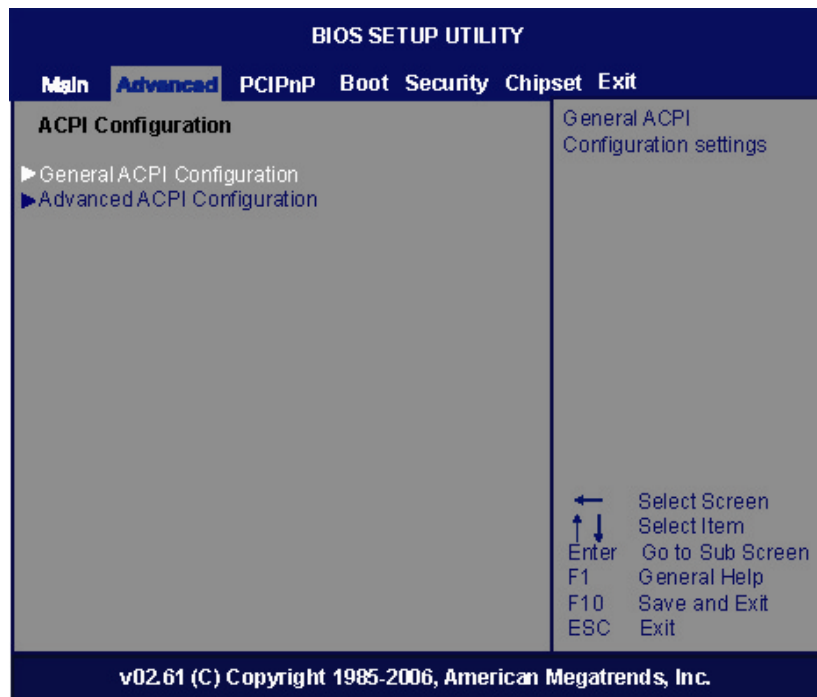


- **System Temperature/CPU Temperature**

These items display the temperature of CPU and System, Vcore, etc

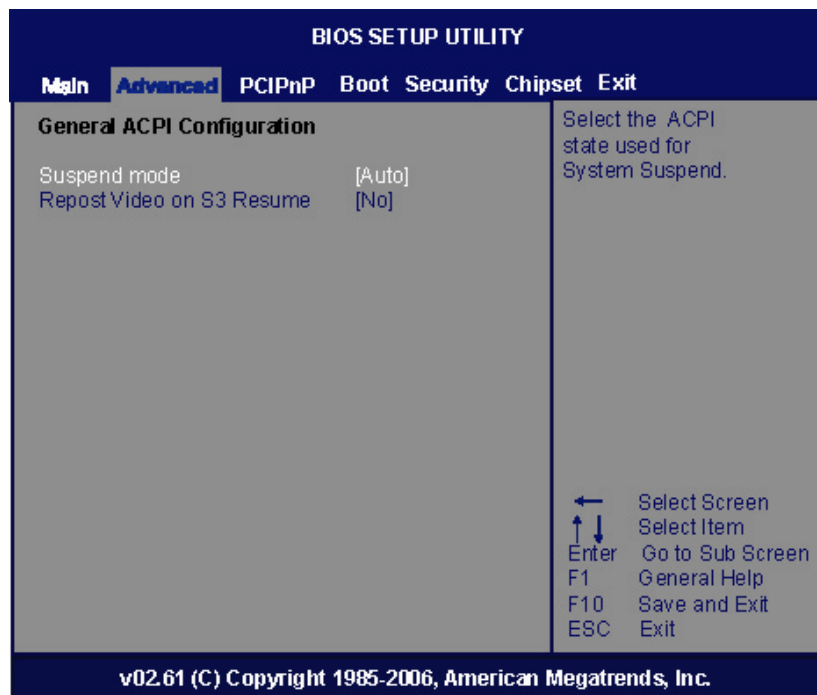
- **ACPI Configuration**

You can use this screen to select options for the ACPI Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

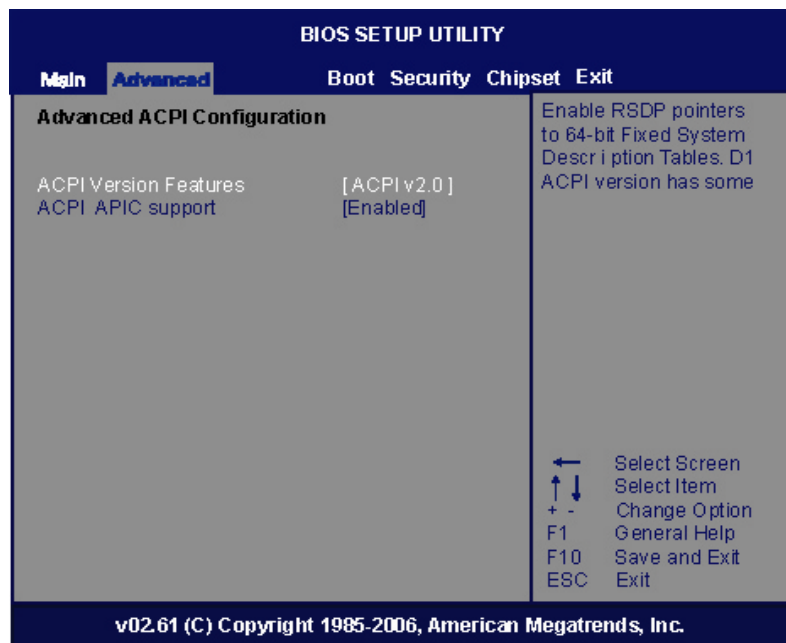


➤ **General ACPI Configuration**

Scroll to this item and press <Enter> to view the General ACPI Configuration sub menu, which contains General ACPI (Advanced Configuration and Power Management Interface) options for your configuration.

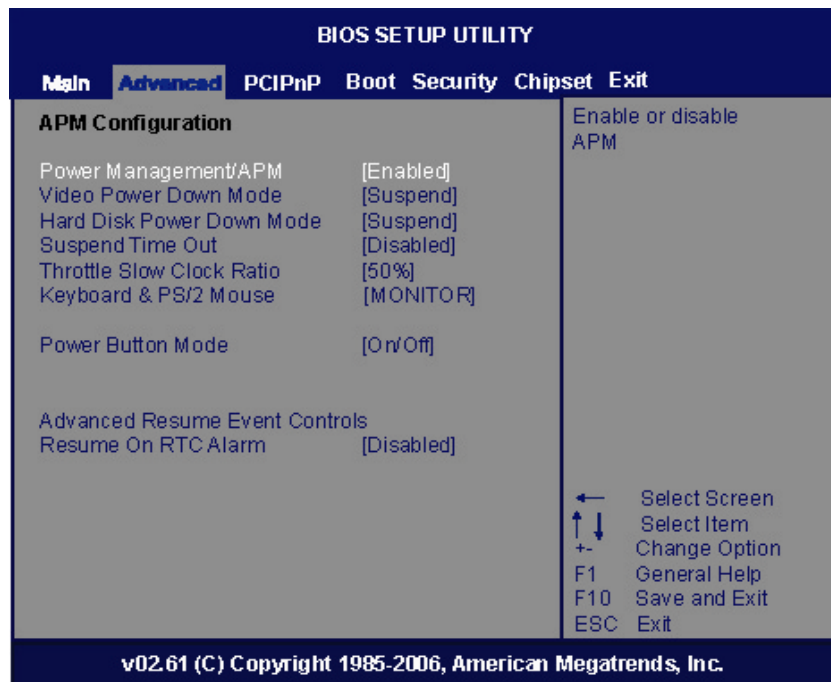


- **Advanced ACPI Configuration**
 Scroll to this item and press <Enter> to view the Advanced ACPI Configuration sub menu, which contains Advanced ACPI (Advanced Configuration and Power Management Interface) options for your configuration.



- **APM Configuration**

You can use this screen to select options for the APM Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



➤ **Power Management/APM**

Set this item to allow Power Management/APM support. The default setting is *Enabled*.

Disabled	Set this item to prevent the chipset power management and APM (Advanced Power Management) features.
Enabled	Set this item to allow the chipset power management and APM (Advanced Power Management) features. This is the default setting.

➤ **Video Power Down Mode**

This option specifies the Power State that the video subsystem enters when the BIOS places it in a power saving state after the specified period of display inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents the BIOS from initiating any power saving modes concerned with the video display or monitor.
Standby	This option places the monitor into standby mode after the specified period of display inactivity has expired. This means the monitor is not off. The screen will appear blacked out. The standards do not cite specific power ratings because they vary from monitor to monitor.
Suspend	This option places the monitor into suspend mode after the specified period of display inactivity has expired. This means the monitor is not off. The screen will appear blacked out. The standards do not cite specific power ratings because they vary from monitor to monitor, but this setting use less power than Standby mode. This is the default setting.

➤ **Hard Disk Drive Power Down Mode**

This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents hard disk drive power down mode.
Standby	This option stops the hard disk drives from spinning during a system standby.
Suspend	This option cuts the power to the hard disk drives during a system suspend. This is the default setting.

➤ **Suspend Time Out (Minute)**

This option specifies the length of time the system waits before it enters suspend mode. The default setting is *Disabled*.

Disabled	This setting prevents the system from entering suspend mode. This is the default setting.
1 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 1 minute.
4 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 4 minutes.
10 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 10 minutes.

➤ **Throttle Slow Clock Ratio**

Use this item to specify the speed of the system clock when running the power saving states.

➤ **Power Button Mode**

This option specifies how the externally mounted power button on the front of the computer chassis is used. The default setting is *On/Off*.

On/Off	Pushing the power button turns the computer on or off. This is the default setting. This is the default setting.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

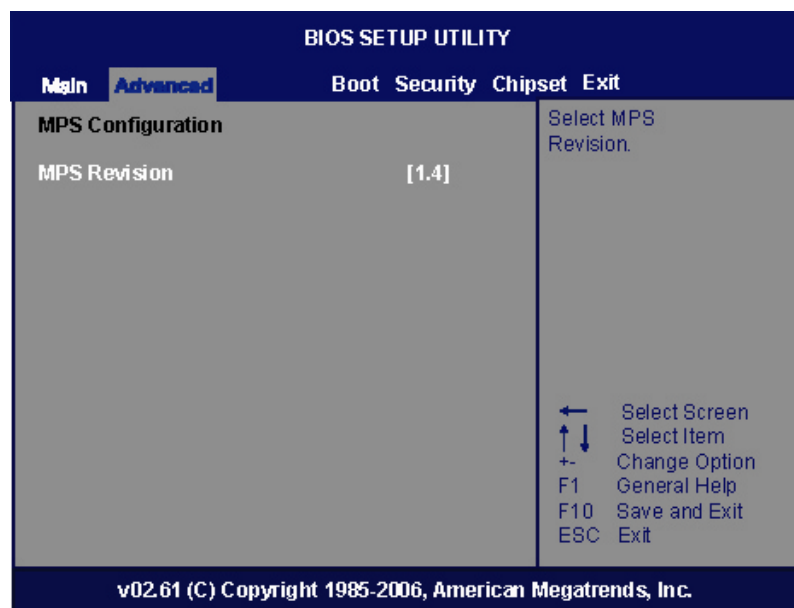
******* Advanced Resume Event Controls *******

➤ **Resume On RTC Alarm**

You can set "Resume On RTC Alarm" item to enabled and key in Data/time to power on system.

- **MPS Configuration**

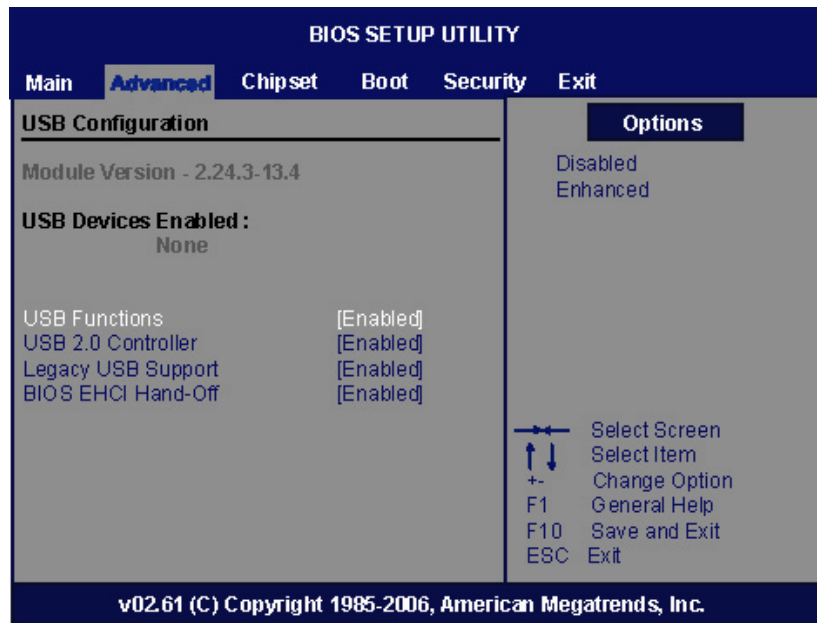
This screen shows the MPS (Multi Processor Specification) Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.



- **MPS Revision**
Use this item to select MPS (Multi Processor Specification) Revision 1.1 or 1.4.

- **USB Configuration**

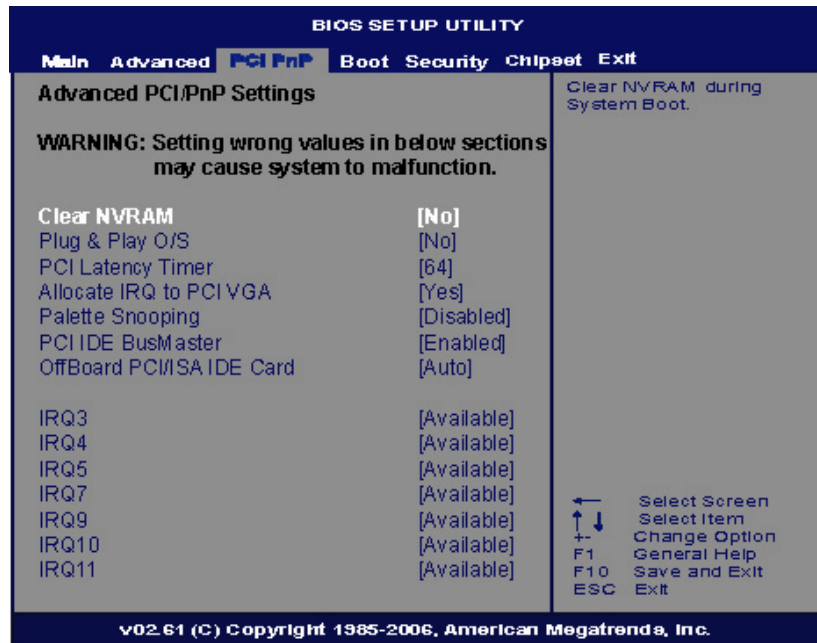
You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



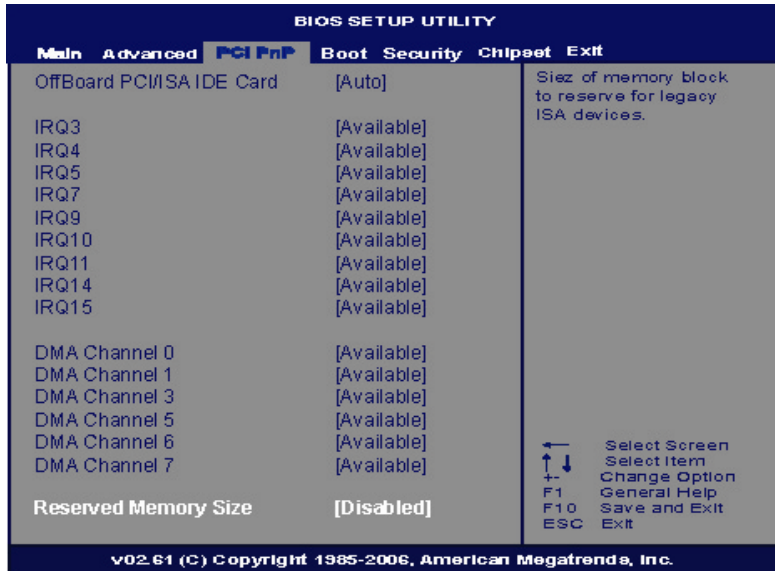
- **USB 2.0 Controller Mode**
Use this item to configure the USB 2.0 controller. The default setting is *HiSpeed*.
- **Legacy USB Support**
Use this item to enable or disable support for USB device on legacy operating system. The default setting is *Enabled*.
- **BIOS EHCI Hand-Off**
Enabling this item provide the support for operating systems without an EHCI hand-off feature. The default setting is *Enabled*.

4.5 PCI PnP Menu

The PCI PnP menu allows users to change the advanced settings for PCI/PnP devices.



(1)



(2)

- **Clear NVRAM**
Use this item to clear the data in the NVRAM (CMOS). Here are the options for your selection, No and Yes.
- **Plug & Play O/S**
When the setting is No, Use this item to configure all the devices in the system. When the setting is Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. The default setting is No.
- **PCI Latency Timer**
This item controls how long a PCI device can hold the PCI bus before another takes over. The longer the latency, the longer the PCI device can retain control of the bus before handing it over to another PCI device. There are several options for your selection.
- **Allocate IRQ to PCI VGA**
This item allows BIOS to choose an IRQ to assign for the PCI VGA card. Here are the options for your selection, No and Yes.

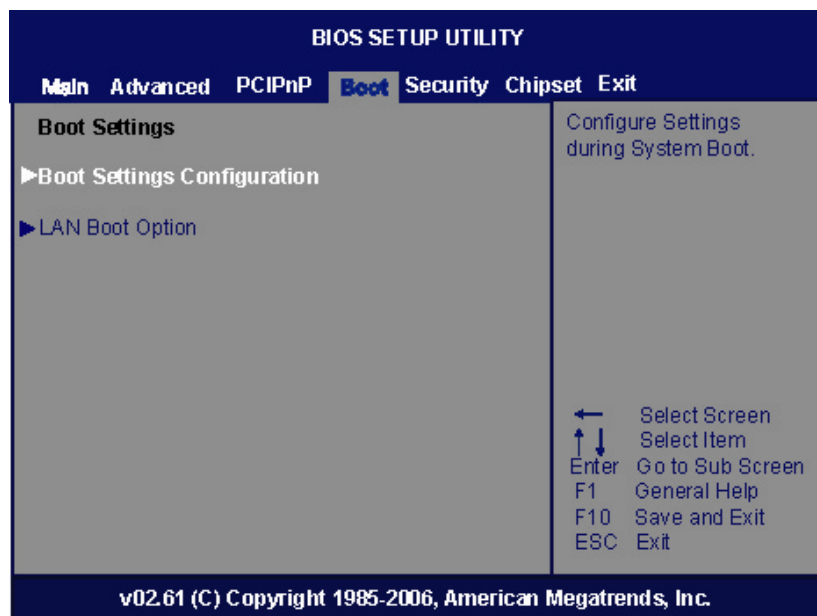
- **Palette Snooping**
Some old graphic controllers need to “snoop” on the VGA palette, and then map it to their display as a way to provide boot information and VGA compatibility. This item allows such snooping to take place. Here are the options for your selection, *Disabled* and *Enabled*.
- **PCI IDE BusMaster**
This item is a toggle for the built-in driver that allows the onboard IDE controller to perform DMA (Direct Memory Access) transfer. Here are the options for your selection, *Disabled* and *Enabled*.
- **OffBoard PCI/ISA IDE Card**
This item is for any other non-onboard PCI/ISA IDE controller adapter. There are several options for your selection.
- **IRQ3/4/5/7/9/10/11/14/15**
These items will allow you to assign each system interrupt a type, depending on the type of device using the interrupt. The option “Available” means the IRQ is going to assign automatically. Here are the options for your selection, *Available* and *Reserved*.
- **DMA Channel 0/1/3/5/6/7**
These items will allow you to assign each DMA channel a type, depending on the type of device using the channel. The option “Available” means the channel is going to assign automatically. Here are the options for your selection, *Available* and *Reserved*.

4.6 Boot Menu

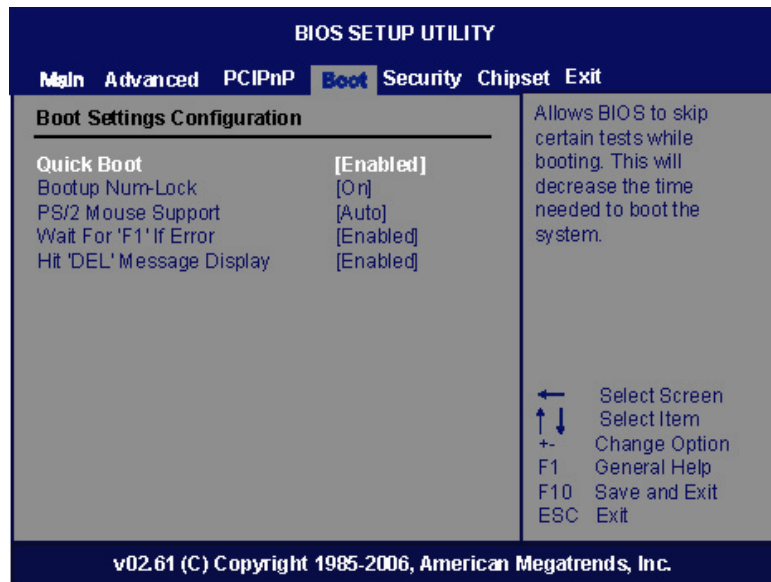
The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:

- Boot Settings Configuration
- LAN Boot Option

For items marked with “▶”, please press <Enter> for more options.



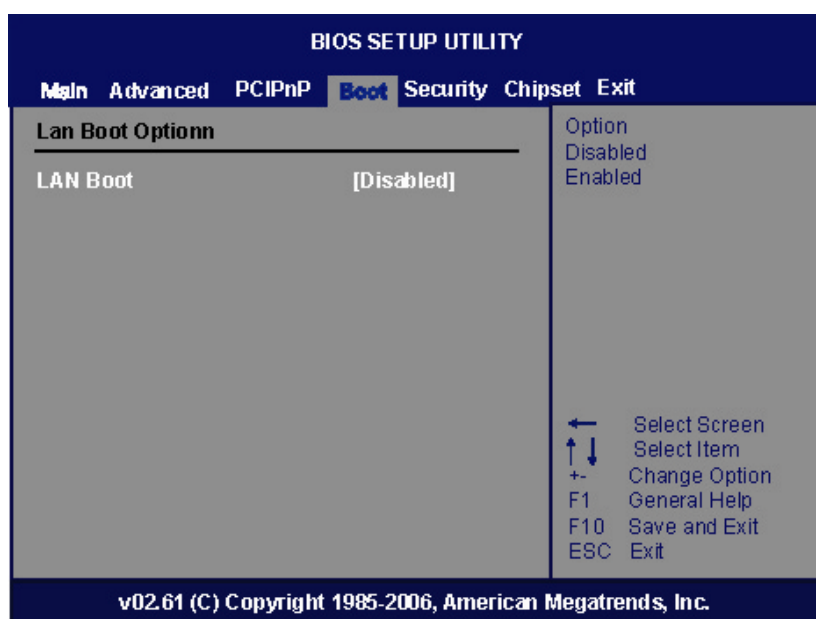
- **Boot Settings Configuration**



- **Quick Boot**
Enabling this item lets the BIOS skip some power on self tests (POST). The default setting is *Enabled*.
- **Boot Num-Lock**
Use this item to select the power-on state for the NumLock. The default setting is *On*.
- **PS/2 Mouse Support**
This item determines if the BIOS should reserve IRQ12 for the PS/2 mouse or allow other devices to make use of this IRQ. Here are the options for your selection, *Auto*, *Enabled* and *Disabled*.
- **Wait For 'F1' Of Error**
If this item is enabled, the system waits for the F1 key to be pressed when error occurs. The default setting is *Enabled*.
- **Hit 'DEL' Message Display**
If this item is enabled, the system displays the message "Press DEL to run Setup" during POST. The default setting is *Enabled*.

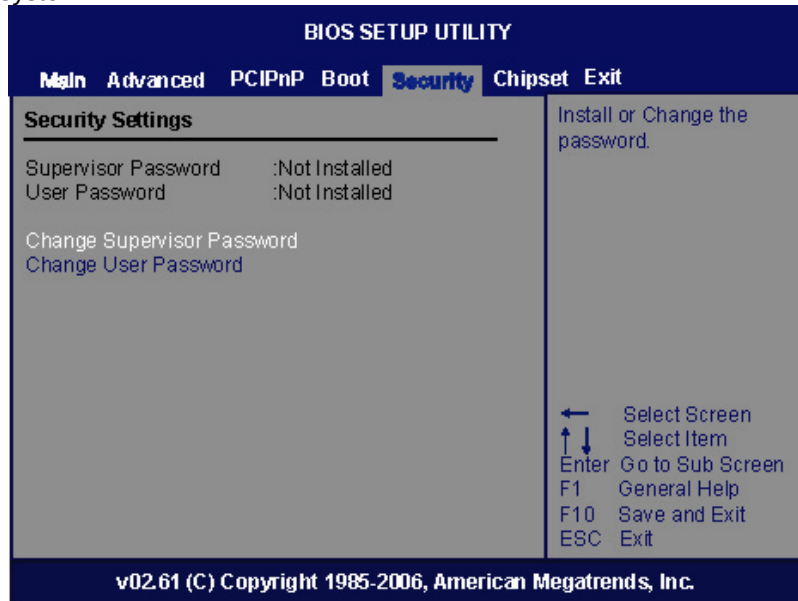
- **LAN Boot Option**

Use these items to enable or disable the Boot ROM function of the onboard LAN chip when the system boots up.



4.7 Security Menu

The Security menu allows users to change the security settings for the system.



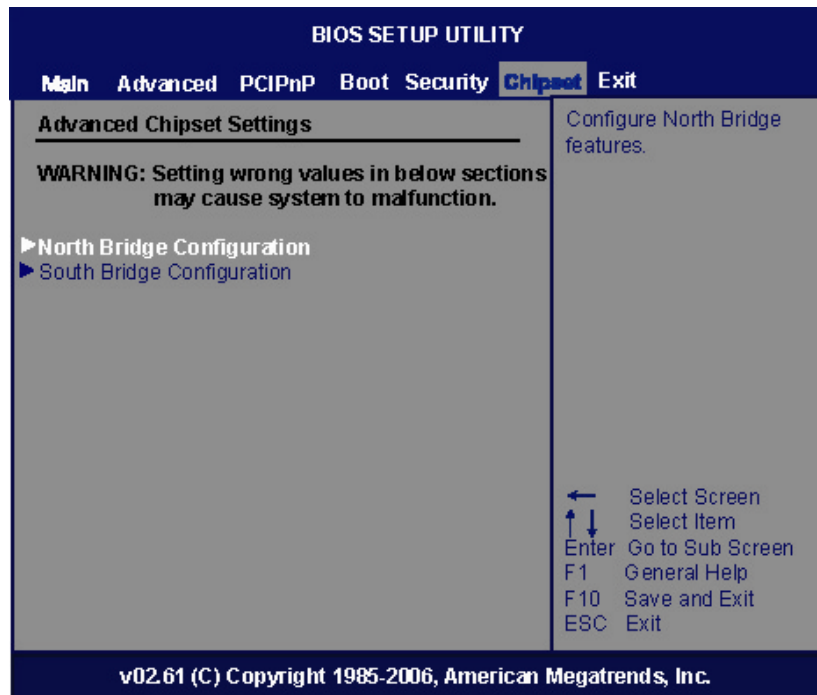
- **Supervisor Password**
This item indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.
- **User Password**
This item indicates whether a user password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.
- **Change Supervisor Password**
Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the supervisor password.
- **Change User Password**
Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the user password.

4.8 Chipset Menu

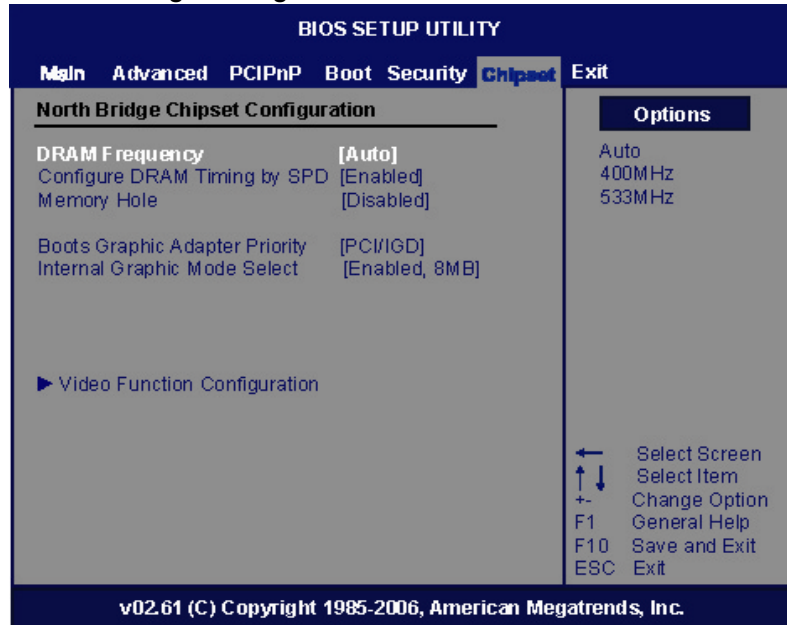
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- North Bridge Configuration
- South Bridge Configuration

For items marked with “▶”, please press <Enter> for more options.

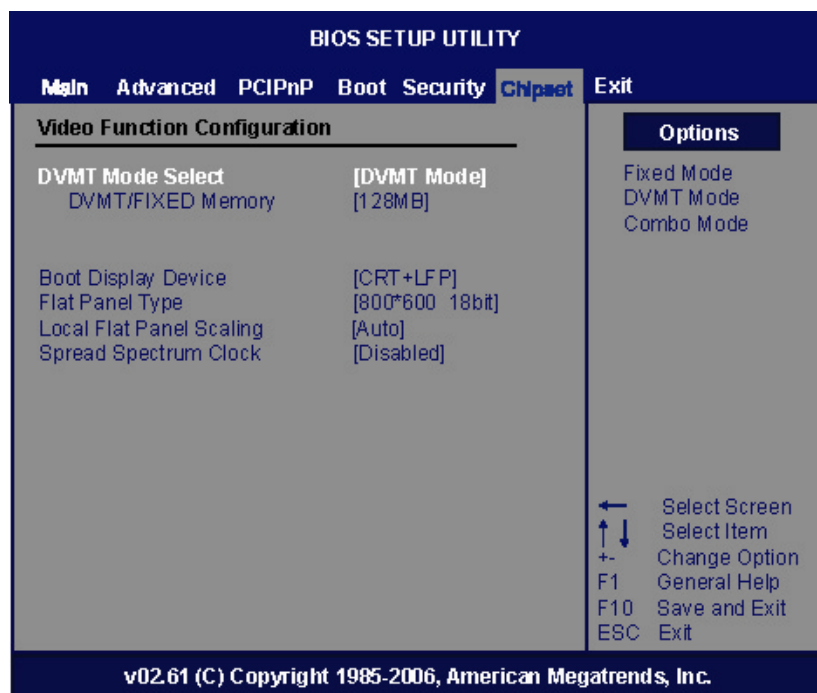


- **North Bridge Configuration**

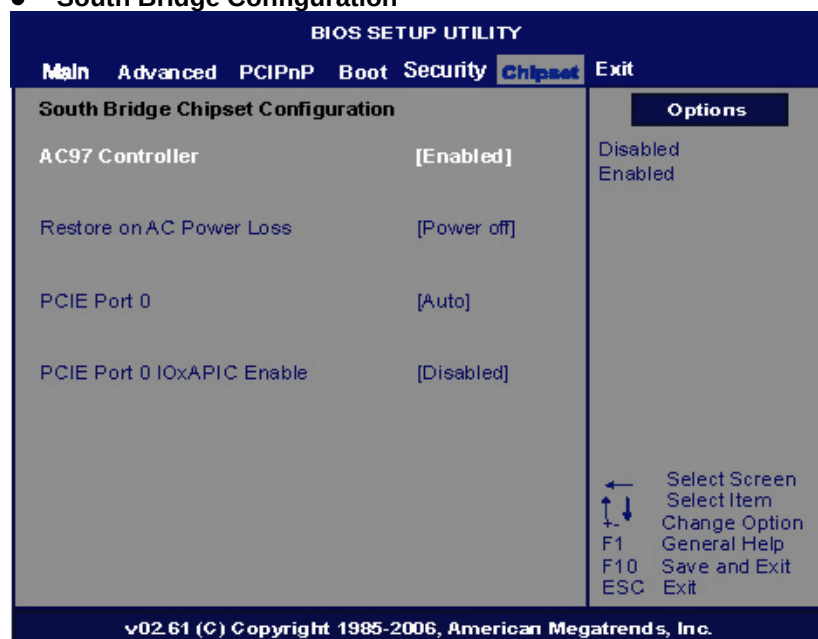


- **DRAM Frequency**
This item allows you to control the Memory Clock.
- **Configure DRAM Timing by SPD**
This item can enable or disable DRAM timing by SPD (Serial Presence Detect) device, which is a small EEPROM chip on the memory module, containing important information about the module speed, size, addressing mode and various parameters.
- **Memory Hole**
You can reserve this area of system memory for ISA adapter ROM. When this area is reserved it cannot be cached. Check the user information of peripherals that need to use this area of system memory for the memory requirements. Here are the options, *Disabled* and *15M-16M*.
- **Boot Graphic Adapter Priority**
This item allows you to select the graphics controller as the primary boot device.

- **Internal Graphics Mode Select**
This item allows you to select the amount of system memory used by the internal graphics device.
- **Video Function Configuration**
Press <Enter> for the sub-menu for setting up video function.



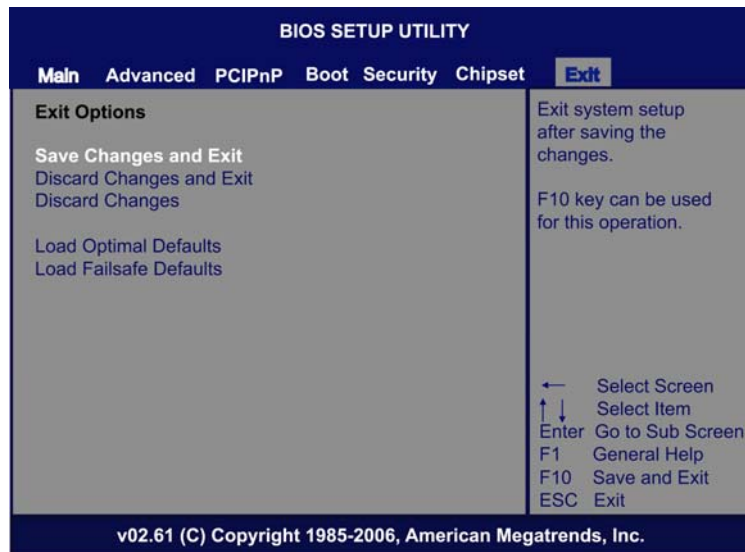
- **South Bridge Configuration**



- **AC97 Controller**
This item allows you to enable or disable the AC97 audio support.
- **Restore on AC Power Loss**
This item can control how the PC will behave once power is restored following a power outage, or other unexpected shutdown.
- **PCIE Port 0 / PCIE Port 0 IOxAPIC**
This item allows you to set or disable the PCI Express Ports.

4.9 Exit Menu

The Exit menu allows users to load your system configuration with optimal or failsafe default values.



- **Save Changes and Exit**
When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select *Save Changes and Exit* from the Exit menu and press <Enter>. Select Ok to save changes and exit.
- **Discard Changes and Exit**
Select this option to quit Setup without making any permanent changes to the system configuration. Select *Discard Changes and Exit* from the Exit menu and press <Enter>. Select Ok to discard changes and exit.
- **Load Optimal Defaults**
It automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance,

but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

➤ **Load Fail-Safe Defaults**

It automatically sets all Setup options to a complete set of default settings when you select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer is experiencing system configuration problems. Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. Select Ok to load Fail-Safe defaults.

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APPENDIX A

WATCHDOG TIMER

Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

Using the Watchdog Function

Start



Un-Lock WDT:

O 2E 87 ; Un-lock super I/O
O 2E 87 ; Un-lock super I/O



Select Logic device:

O 2E 07
O 2F 08



Activate WDT:

O 2E 30
O 2F 01



Set Second or Minute :

O 2E F5
O 2F N N=00 or 08(See below table)



Set base timer :

O 2E F6
O 2F M=00,01,02,...FF(Hex) ,Value=0 to 255



WDT counting re-set timer :

O 2E F6
O 2F M ; M=00,01,02,...FF(See below table)

; IF to disable WDT:

O 2E 30

O 2F 00 ; Can be disable at any time

- Timeout Value Range
 - 1 to 255
 - Minute / Second
- Program Sample

Watchdog Timer can be set to system reset after 5-second timeout.

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	
2F, N	Set Minute or Second N=08 (Min),00(Sec)
2E, F6	
2F, M	Set Value M = 00 ~ FF

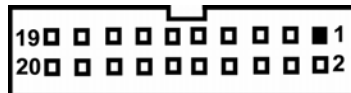
APPENDIX B

DIGITAL I/O

Digital I/O Software Programming (For STB86600 DIO Port)

- Digital I/O Connector : DIO1

Pin	Signal	Pin	Signal
1	Digital Output 0 (Bit 0)	2	Digital Input 0 (Bit 0)
3	Digital Output 1 (Bit 1)	4	Digital Input 1 (Bit 1)
5	Digital Output 2 (Bit 2)	6	Digital Input 2 (Bit 2)
7	Digital Output 3 (Bit 3)	8	Digital Input 3 (Bit 3)
9	Digital Output 4 (Bit 4)	10	Digital Input 4 (Bit 4)
11	Digital Output 5 (Bit 5)	12	Digital Input 5 (Bit 5)
13	Digital Output 6 (Bit 6)	14	Digital Input 6 (Bit 6)
15	Digital Output 7 (Bit 7)	16	Digital Input 7 (Bit 7)
17	GND	18	GND
19	N.C	20	N.C



- The Digital I/O on the board is not an isolated type :

Output	Address	Bit	Input	Address	Bit
Out 0	123h	0	In 0	123h	0
Out 1	123h	1	In 1	123h	1
Out 2	123h	2	In 2	123h	2
Out3	123h	3	In 3	123h	3
Out 4	123h	4	In 4	123h	4
Out 5	123h	5	In 5	123h	5
Out 6	123h	6	In 6	123h	6
Out 7	123h	7	In 7	123h	7

- DIO output program sample :

O 123 03	Out 0, Out 1 is High, Out 2~7 is Low (1 High , 0 Low)
O 123 0A	Out 1, Out 3 is High, Out 0,2,4~7 is Low (1 High , 0 Low)

***** The DIO input signal has to be TTL signal *****

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